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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,319	04/16/2004	Kristy A. Campbell	M4065.0703/P703-A	7790
24998	7590	04/14/2005	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			VU, DAVID	
2101 L Street, NW			ART UNIT	
Washington, DC 20037			PAPER NUMBER	

2818

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/825,319

Applicant(s)

CAMPBELL ET AL.



Examiner

DAVID VU

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>05/06/04</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 26, 31, 35, 39-41, 43 and 46 are rejected under 35 U. S. C. 102(e) as being anticipated by Moore et al. (US 6,348,365, herein after Moore).

Moore discloses in col. 2, line 36 through col. 3, line 65 and figs. 1-6 a method of forming a chalcogenide structure, method comprising: forming a semiconductor substrate 10; forming a first dielectric layer 11 over semiconductor substrate 10; forming a first conductive layer 12 over first dielectric layer 11; forming a second dielectric layer 13 over first conductive layer 12; forming an opening 22 in at least a portion of second dielectric layer 13, wherein at least a portion of first conductive 12 layer is exposed; forming a chalcogenide glass layer 41 at least over a portion of opening; forming a silver layer 41 over chalcogenide glass layer 51 and dielectric layer 13; diffusing at least a portion of silver layer 41 into chalcogenide glass layer 51, wherein step of diffusing forms a rough outer surface (amorphous metal ion-laced glass layer )

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on chalcogenide glass layer 51; removing at least a portion of rough outer surface to form a smoother surface by chemical mechanical planarization (CMP); and forming a second conductive layer 61 over chalcogenide glass layer. Note that conventional CMP processes, the rough outer surface layer is pressed against the fixed-abrasive pad in the presence of planarizing solution, and at least one of the fixed-abrasive pad or the rough outer surface layer moves relative to the other to remove material from the surface of the rough outer surface layer {See also **Hudson** (US Pat. 5,972,792) (col. 1, lines 10-27)}.

2. Claims 26, 30, 31, 35, 39-43 and 46-48 are rejected under 35 U. S. C. 102(e) as being anticipated by Kozicki (US 6,487,106).

Kozicki discloses in fig. 1 a method of forming a chalcogenide structure, method comprising: forming a semiconductor substrate 114; forming a first dielectric layer 112 over semiconductor substrate 114; forming a first conductive layer 130 over first dielectric layer 112; forming a second dielectric layer 150 over first conductive layer 112; forming an opening in at least a portion of second dielectric layer 150, wherein at least a portion of first conductive 130 layer is exposed (col. 6, lines 58-61); forming a chalcogenide glass layer 140 at least over a portion of opening; forming a silver layer 140 over chalcogenide glass layer 140 and dielectric layer 150 (col. 5, lines 36-64); diffusing at least a portion of silver layer 140 into chalcogenide glass layer 140, wherein step of diffusing forms a rough outer surface (amorphous metal ion-laced glass layer ) on chalcogenide glass layer 140 (col. 6, lines 13-29, col. 8, lines 35-37); removing at least a portion of rough outer surface to form a smoother surface by chemical mechanical planarization (CMP) (col. 6, line 62 through col. 7, line 4); and forming a second

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conductive layer 120 over chalcogenide glass layer 140. Note that conventional CMP processes, the rough outer surface layer is pressed against the fixed-abrasive pad in the presence of planarizing solution, and at least one of the fixed-abrasive pad or the rough outer surface layer moves relative to the other to remove material from the surface of the rough outer surface layer {See also **Hudson** (US Pat. 5,972,792) (col. 1, lines 10-27)}.

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 27-28, 32-33 and 36-37 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kozicki (US 6,487,106) in view of Hudson (US Pat. 5,972,792).

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Kozicki fails to disclose the fluid is an iodine solution. However, Hudson teaches in col. 4, lines 41-49 that the planarizing solution is a potassium iodine. It would have been obvious to one with ordinary skill in the art at the time of the invention for smoothing rough outer surface with a potassium iodine fluid as taught by Hudson in the process of Kozicki in order to increase the throughput of CMP processes (col. 3, lines 25-37).

4. Claims 29, 34 and 38 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kozicki (US 6,487,106) in view of Hudson (US Pat. 5,972,792).

Kozicki fails to disclose the composition of potassium iodide solution. One of ordinary skill in the art would have considered it obvious to have modified the Hudson planarizing solution by using potassium iodide solution comprises 5-30 grams  $I_2$  per liter of a from about 20% to about 50% potassium iodide solution because the composition of the planarizing solution would be a matter of mere routine optimization to select which are best for the process of forming a chalcogenide device. Moreover, the composition of the planarizing solution does not provide any critical or unexpected results to the method of manufacturing a chalcogenide device. Rather, it is merely an obvious design choice determinable by routine experimentation. In *Aller*, the court stated, "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In *re Aller*, 220 F.2d 454, 456 105 USPQ 233,235 (CCPA 1995).

5. Claims 44 and 45 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kozicki (US 6,487,106).

Kozicki fails to disclose the metal containing layer and conductive layer is about 140-200Å thick. It would have been obvious to one with ordinary skill in the art at the time of the invention to form a metal containing layer and conductive layer as taught by Kozicki. The thickness is well known processing variable and the discovery of the optimum or workable range involves only routine skill in the art. The specific thickness of metal containing layer and conductive layer does not provide any critical or unexpected results to the method of manufacturing a chalcogenide device. Rather, it is merely an obvious design choice determinable by routine experimentation. In *Aller*, the court stated, "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456 105 USPQ 233,235 (CCPA 1995).

### **Conclusion**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (571) 272-1798. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David Vu

April 08, 2005.